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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,323	12/04/2001	Masayuki Mishima	Q67519	9759

7590 06/02/2004

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213

EXAMINER	
COLON, GERMAN	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/000,323	MISHIMA, MASAYUKI	
	Examiner	Art Unit	
	German Colón	2879	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Amendment, filed on January 30, 2004, has been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriyama et al. (US 2002/0068192) in view of Tsai et al. (US 6,566,805).

Regarding claim 1, Moriyama discloses a method of producing a light-emitting device comprising the steps of disposing a transparent electrode **2**, one or more organic layers **3** and a back side electrode **5** on a substrate **1** to provide a light-emitting structure, and disposing sealing parts **6** on said light-emitting structure to isolate said one or more organic layers from external air, wherein said one or more organic layers comprises a light-emitting layer **3** containing a phosphorescent compound (see paragraph [0048]), and said light-emitting layer, said back side electrode and said sealing parts are disposed in an inert gas atmosphere (see paragraph [0058]). Moriyama teaches the detrimental effects caused by moisture and oxygen to the OLED (see paragraphs [0019] and [0020]) but is silent regarding their concentrations within the sealed atmosphere.

However, in the same field of endeavor, Tsai teaches that in order to avoid the adverse effects of oxygen and moisture in an OLED, such as peeling off or degeneration of the electrode layers resulting in dark spots and decrease in the lifetime of the device (see Col. 2, lines 6-19, and Col. 3, lines 1-7), the required content of oxygen and water (moisture) should be no more than 1 ppm (see Col. 3, lines 9-10). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the OLED of Moriyama with a moisture and oxygen content of no more than 1 ppm, with the purpose of avoiding the adverse effects of oxygen and moisture in an OLED, such as peeling off or degeneration of the electrode layers resulting in dark spots and decrease in the lifetime of the device.

Regarding claim 2, Moriyama discloses said one or more organic layers being isolated form external air after disposing said one or more organic layers until said sealing parts are disposed (see paragraph [0071] and [0082]).

Regarding claims 3 and 4, Moriyama-Tsai discloses both of said moisture concentration and said oxygen concentration being 1 ppm or less.

Referring to claim 5, Moriyama discloses at least one of said organic layers being formed by a wet film-forming method (see paragraph [0047], lines 9-10).

Referring to claim 6, Moriyama discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see paragraph [0047], lines 3-9).

Referring to claim 7, Moriyama discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see paragraph [0047], lines 6-8 in view of lines 9-10).

Regarding claim 8, Moriyama discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see paragraph [0047], lines 3-9).

Regarding claim 9, Moriyama discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see paragraph [0066] lines 4-5).

Regarding claim 10, Moriyama discloses said phosphorescent compound being an ortho-metallation complex (see paragraph [0048], lines 5-8, and paragraph [0066], line 4).

Regarding claim 11, Moriyama discloses an UV-hardening resin being used in combination with said sealing parts to isolate said one or more organic layers from external air (see paragraph [0056] lines 4-5).

Referring to claim 12, Moriyama-Tsai discloses a light-emitting device comprising a transparent electrode **2**, one or more organic layers **3** and a back side electrode **5** on a substrate **1** to provide a light-emitting structure, and disposing sealing parts **6** on said light-emitting structure to isolate said one or more organic layers from external air, wherein said one or more organic layers comprises a light-emitting layer **3** containing a phosphorescent compound (see paragraph [0048]), and said light-emitting layer, said back side electrode and said sealing parts are disposed in an inert gas atmosphere (see paragraph [0058]) where both a moisture concentration and an oxygen concentration are 1 ppm or less. Same reasons for combining stated in claim 1 apply.

Referring to claim 13, Moriyama discloses said one or more organic layers being isolated form external air after disposing said one or more organic layers until said sealing parts are disposed (see paragraph [0071] and [0082]).

Referring to claims 14 and 15, Moriyama-Tsai discloses both of said moisture concentration and said oxygen concentration being 1 ppm or less.

Referring to claim 16, Moriyama discloses at least one of said organic layers being formed by a wet film-forming method (see paragraph [0047], lines 9-10).

Referring to claim 17, Moriyama discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see paragraph [0047], lines 3-9).

Regarding claim 18, Moriyama discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see paragraph [0047], lines 6-8 in view of lines 9-10).

Regarding claim 19, Moriyama discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see paragraph [0047], lines 3-9).

Regarding claim 20, Moriyama discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see paragraph [0066] lines 4-5).

4. Claims 1, 3, 4-12, and 14-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. (US 6,097,147) in view of Yasukawa et al. (US 6,268,071), further in view of Tsai et al. (US 6,566,805).

Regarding claim 1, Baldo discloses a method of producing a light-emitting device (see Fig. 3) comprising the steps of disposing a transparent electrode **511**, one or more organic layers

512-515 and a back side electrode **516** on a substrate **510** to provide a light-emitting structure, wherein said one or more organic layers comprises a light-emitting layer **513** containing a phosphorescent compound. Baldo is silent regarding the limitation of "disposing sealing parts to isolate said one or more organic layers from external air, wherein said sealing parts are disposed in an inert gas atmosphere where both of a moisture concentration and oxygen concentration are 100 ppm or less".

However, in the same field of endeavor, Yasukawa discloses an OLED comprising sealing parts to isolate the organic layers from external air (see Fig. 1), because OLEDs are acutely sensitive to moisture which causes degeneration of the electrodes resulting in non-light emission spots (see Col. 1, lines 23-29). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the sealing parts disclosed by Yasukawa to the light-emitting device of Baldo, in order to avoid exposure of the OLED to moisture which causes degeneration of the electrodes resulting in non-light emission spots.

Baldo-Yasukawa discloses a light-emitting device having a light-emitting structure enclosed by sealing parts in an inert gas atmosphere. Yasukawa teaches said inert gas atmosphere having a moisture content of 100 ppm or lower, and especially 1 ppm or lower (see Col. 8, lines 63-67). Yasukawa discloses the desirability of avoiding penetration of oxygen to the light-emitting structure (see Col. 8, lines 13-14) but is silent regarding the preferred concentration of oxygen within the sealed atmosphere.

However, in the same field of endeavor, Tsai teaches that in order to avoid the adverse effects of oxygen and moisture in an OLED, which deteriorate the performance and decrease the lifetime of the device (see Col. 2, lines 6-19, and Col. 3, lines 1-7), the required content of both

oxygen and water (moisture) should be no more than 1 ppm (see Col. 3, lines 9-10). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the OLED of Baldo-Yasukawa with an oxygen content of not more than 1 ppm, to avoid the adverse effects of oxygen which deteriorates the performance and decreases the lifetime of the device.

Regarding claims 3 and 4, Baldo-Yasukawa-Tsai discloses both the moisture concentration and the oxygen concentration being 1 ppm or less.

Regarding claim 5, Baldo discloses the at least one of said organic layers being formed by a wet film-forming method (see Col. 5, lines 49-51).

Regarding claim 6, Baldo discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see Fig. 3).

Referring to claim 7, Baldo discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see Col. 5, lines 49-51).

Referring to claim 8, Baldo discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see Fig. 3).

Referring to claim 9, Baldo discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see Col. 6, line 11).

Referring to claim 10, Baldo discloses said phosphorescent compound being an ortho-metallation complex (see Col. 6, line 11).

Regarding claim 11, Baldo-Yasukawa-Tsai discloses an UV-hardening resin being used in combination with said sealing parts to isolate said one or more organic layers from external air (see '071, Col. 3, line 64 to Col. 4, line 3).

Regarding claim 12, Baldo-Yasukawa-Tsai discloses a light-emitting device comprising a transparent electrode **511**, one or more organic layers **512-515** and a back side electrode **516** on a substrate **510** to provide a light-emitting structure, wherein said one or more organic layers comprises a light-emitting layer **513** containing a phosphorescent compound; sealing parts to isolate the organic layers from external air (see Fig. 1 of '071); wherein said light-emitting structure and said sealing parts are disposed in an inert gas atmosphere where both a moisture concentration and an oxygen concentration are 1 ppm or less. Same reasons for combining stated in claim 1 apply.

Regarding claims 14 and 15, claims 14 and 15 are rejected over the reasons stated in the rejection of claims 3 and 4, respectively.

Referring to claims 16-20, claims 16, 17, 18, 19 and 20 are rejected over the reasons stated in the rejection of claims 5, 6, 7, 8, and 9, respectively.

Response to Arguments

5. Applicant's arguments filed January 30, 2004 have been fully considered but they are not persuasive.

Prior responding to Applicant's arguments, the Examiner wants to point out that although the cover sheet of the Communication filed 1/30/2004 and the substance of said Communication

is directed to application SN 10/000,323, all the following sheets have been headed as corresponding to application SN 10/097,607.

i. Applicant argues that Moriyama (US 2002/0068192) and Tsai (US 6,566,805) do not disclose the use of an inert gas which also has a specified oxygen concentration and a specified water concentration.

The Examiner notes that the claimed invention refers to a method of making a light-emitting device comprising a light-emitting structure and sealing parts, wherein an [inert gas] atmosphere between the light-emitting structure and the sealing parts has an oxygen concentration and a moisture concentration of 100 ppm or less.

The combination Moriyama-Tsai discloses a light emitting device comprising a light emitting structure and sealing parts having an [inert gas] atmosphere between them. Tsai teaches a preferred oxygen and moisture concentration to avoid detrimental effects to the light-emitting layer. Thus, the light-emitting device of Moriyama-Tsai *has* an [inert gas] atmosphere with an oxygen concentration and a moisture concentration in the claimed range.

It seems to be Applicant's position that the [inert gas] atmosphere introduced between the light-emitting layer and the sealing parts had a specified concentration of oxygen and moisture prior sealing of the device. However, the claims do not recite that limitation. The claims only recite that the final product, i.e. after sealing the device, the atmosphere has a particular concentration.

Further, for the sake of argument, one having ordinary skills in the art, using the teachings of Moriyama and Tsai, would entertain the idea of using during the process of sealing

the light-emitting device an inert gas having a moisture and oxygen concentration in an amount substantially equal to the desired final amount in order to reduce the number of manufacturing steps, i.e. an additional step for reducing the amount of oxygen and moisture in the gas.

ii. Applicant argues that Baldo (US 6,097,147) in view of Yasukawa (US 6,268,071) further in view of Tsai fail to disclose the use of an inert gas having a specified concentration of both water and oxygen.

Same response to arguments stated in part (i.) applies. Further, Yasukawa evidences the use of an inert gas which has a moisture content of 100 ppm or less. One of ordinary skill in the art would entertain the idea of providing said inert gas with a low oxygen content to reduce the number of steps during manufacture of the device.

For the reasons stated above the rejection of claims 1-20 is deemed proper.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to German Colón whose telephone number is 571-272-2451. The examiner can normally be reached on Monday thru Thursday, from 8:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gc

ASHOK PATEL
PRIMARY EXAMINER